[NAME OF DOCUMENT] Specification

[TITLE OF THE INVENTION] METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE

[WHAT IS CLAIMED IS:]

[Claim 1] A method for manufacturing a semiconductor device comprising the steps of;

forming an amorphous silicon film on a substrate having an insulating surface;

patterning the amorphous silicon film in a predetermined patten;

holding a metal element which promotes crystallization of silicon in contact with the amorphous silicon film;

converting the amorphous silicon film into a crystalline silicon film by heat treatment for crystallization; and

etching the peripheral portion of a pattern of the crystalline silicon film.

[Claim 2] A method for manufacturing a semiconductor device comprising the steps of:

forming a region into which a defect and/or stress is concentrated in a predetermined region of an amorphous silicon film;

holding a metal element which promotes crystallization of silicon in contact with said amorphous silicon film;

crystallizing said amorphous silicon film by heat treatment; and

etching said predetermined region.

[Claim 3] A method for manufacturing a semiconductor device comprising the steps of:

forming a region into which a defect and/or stress is concentrated in a predetermined region of an amorphous silicon film;

holding a metal element which promotes crystallization of silicon in contact with said amorphous silicon film;

crystallizing said amorphous silicon film by heat treatment while segregating the metal element in the predetermined region; and

etching said predetermined region.

[Claim 4] A method for manufacturing a semiconductor device comprising the steps of:

forming a region into which defects and/or stress is concentrated in a predetermined region of an amorphous silicon film;

holding a metal element which promotes crystallization of silicon in contact with said amorphous silicon film;

crystallizing said amorphous silicon film by heat treatment while segregating the metal element, thereby removing the metal element from a region to be an active layer or a region to be a channel forming region of a semiconductor device; and

etching the predetermined region.

[Claim 5] The method according to claim 1 to 4 wherein the metal element which promotes the crystallization of silicon is one or plural sorts selected from Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

[Claim 6] The method according to claim 1 to 4 wherein the heat treatment is performed at a temperature of 450 to 700°C.

[Claim 7] The method according to claim 1 to 4 wherein an amorphous silicon film is formed on a quartz substrate and a heat treatment is performed at a temperature of 800 to 1100°C.

[Claim 8] The method according to claim 2 to 4 wherein a distance "d" between said selected region and a center of obtained crystalline silicon film is expressed by D/30 to D, where D is a dispersion distance of said metal element.

[Claim 9] The method of claim 8 wherein the distance "d" is expressed by d=0.2μm to 2μm.

[Claim 10] The method of claim 8 wherein the dispersion distance "D" is expressed by $D=D_0 t \exp(\Delta E/kt)$.

[Claim 11] The method according to claim 2 to 4 wherein the region into which a defect and/or stress is concentrated is formed by implantation of phosphorus ion or oxygen ion in the predetermined region.